

A STUDY OF CUTANEOUS LEISHMANIASIS IN PALESTINE

BY

A. DOSTROWSKY, M.D.

*(Dermatological Department, Rothschild Hospital, Hadassah Medical
Organisation)*

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PLATES XXX-XXXII

Cases of cutaneous Leishmaniasis in Palestine are either imported from neighbouring countries or they are acquired in Palestine itself. Of the hundred cases* which are dealt with in the present paper, twenty-eight were acquired locally, the remainder were imported from :—

Persia	...	...	...	31 cases
Mesopotamia	...	...	...	36 „
Syria	...	...	...	1 case
Egypt	...	...	...	1 „
Afghanistan	...	...	...	1 „
Samarkand	...	...	...	1 „
Transjordan	...	...	...	1 „
				—
				72 cases
				—

There is no absolute certainty as to the source of the infection in all the patients from Persia for all these pass through such endemic centres as Baghdad or Aleppo on their way to Palestine.

The cases acquired in Palestine come from various localities which, with the exception of Jericho, have only recently been discovered to be foci of disease.

* Our material reached 127 cases, but full details were obtained in only 100 cases.

Kligler (1923) found three cases of the disease in Kantara (30 kilometres south of the boundary of Palestine).

Dostrowsky (1925), during 1923-1924, found ten cases in Artuf, a village 22 kilometres from Jerusalem, with a population of 114. During 1925 another case (referred to below as Case III) was found in this village.

The author (1925) expressed his opinion that cutaneous Leishmaniasis in Palestine was not confined to limited and circumscribed areas and that careful clinical and microscopical observations would disclose new foci throughout the whole country. The following clinical histories support this view.

CASE I. Card No. 1332, female, 19 years old from Mozza, a Jewish village seven kilometres from Jerusalem (2,115-2,570 feet above sea level).

The case was first seen 11.5.24. On the left forearm an ulcer 0.5 cm. in diameter. The subcutaneous tissue was indurated, the ulcer was surrounded by a reddish infiltrated area. The patient had never been to Jericho but had made several trips to Jaffa and Jerusalem. She had noticed the ulcer eleven weeks before reporting to the clinic. No other signs or symptoms were noted. Leishman-Donovan bodies were found in a smear of the ulcer.

CASE II. Plate XXX, fig. 1. Card No. 1966. Male, 10 years old, from Beth-Djalla, 8 kilometres from Jerusalem, 1,690 feet above sea level. A village near Bethlehem. First seen 30.7.24.

An almost round ulcer 2 cm. in diameter covered with sero-haemorrhagic crust; on removal of the crust the margins of the ulcer were found to be prominent and not undermined; the floor of the shallow ulcer was covered with papillary granulations. The margin of the ulcer was surrounded by a reddish infiltrated area, 0.5 cm. wide, elevated above the surrounding normal skin. The lesion was indurated but not attached to the subcutaneous tissue. The patient gave a history of three months. He had never been in Jericho, but had visited Jerusalem several times. Leishman-Donovan bodies were found in a smear from the ulcer.

CASE III. Card No. 11776. Male, 41 years old, from Artuf, 22 kilometres from Jerusalem, 1,090 feet above the sea level.

The case was first seen 26.3.25. On the left ankle an ulcer the size of a shilling piece covered with a seropurulent crust. The area round the ulcer was swollen. The duration of the ulcer was three and a half months. Leishman-Donovan bodies were found in a smear.

CASE IV. Plate XXX, fig. 2. Card No. 337. Male, 15 years old, from Beth-Djalla.

First seen 28.10.25. One irregular ulcer on the face and one on the left forearm. Both were typical oriental sores. Duration three months. The patient had never visited Jericho. Numerous Leishman-Donovan bodies were found in smears from both ulcers.

CASE V. Plate XXXI, fig. 1. Card No. 9561. Female, eight and a half years old.

First seen 31.1.26. An elevation 1 cm. in diameter covered with scales a serous crust was found on the nose. The lesion was indurated, indolent and surrounded by a brownish-violet area. A similar lesion was found on the leg dorsally. During the last two years has never left Jerusalem. The patient had never visited Jericho. Numerous Leishman-Donovan bodies were found in smears of both lesions. The lesions first appeared in September, 1925. The family at the time lived in Beth-Hakerem, a new suburb of Jerusalem three kilometres west of the city.

CASE VI. Card No. 1427. Male, 14 years old, brother of Case V.

First seen on April 25, 1925. On the right side of the neck, an oval erythematous elevation 0.8 cm. long was found. The centre of the lesion was hard and indolent. Leishman-Donovan bodies were found in the lesion. The lesion, according to statement of the patient, appeared in February, 1926, six months after the patient's family left Beth-Hakerem and settled in the city. The patient had never been to Jericho.

CASE VII. Card No. 1374. Female, 6 years old, sister of Cases V and VI.

Seen on 25.3.26. A hard indolent bluish-red button-like nodule about the size of a bean and covered with scales was seen on the right cheek. On the left cheek two small similar lesions. The nodules were first noted in January, 1926. The patient had never visited Jericho. Leishman-Donovan bodies found in a smear of the lesion.

CASE VIII. Card No. 2358. Female, 20 years old.

Seen on 1.7.26. On the right forearm under the olecranon process a hard bluish-red nodule covered with smooth skin (no scales). The lesion was indolent and showed induration down to the subcutaneous tissue. History four months. Another indurated lesion 2 cm. in diameter ulcerated in the centre and covered with a sero-haemorrhagic crust and surrounded by a bluish-red margin was found immediately below the first lesion. Both lesions were painless. History 9 months. Tissue was removed from the first lesion and on section Leishman-Donovan bodies were found.

Patient, a native of Roumania, arrived in Palestine, May, 1925, and lived in Tel-Aviv two weeks and then two months in Beth-Hakerem in the same house which case V occupied at the time. She then returned to Tel-Aviv for three months and subsequently lived in Jerusalem. The patient had never visited Jericho.

CASE IX. Dr. A. Beham, Director of the Pasteur Institute, Jerusalem, kindly reported to the author a case of cutaneous Leishmaniasis from Sechem. Patient, female, 22 years old, showed two lesions, one a small ulcer and the other a nodule on the left side of the forehead above the eye. Three other lesions were found on the left leg near the external malleolus. Leishman-Donovan bodies were found in all the lesions. The patient had never left Sechem during the previous eighteen years, and had never visited Jericho.

It is quite probable that owing to non-differentiation between oriental sore and other lesions of the skin the number of cases in Palestine is really greater than is at present suspected.

The number of parasites in different cases was very variable, in some cases a smear was found swarming with Leishman-Donovan bodies and in others these bodies were found after a search of several hours. There were cases diagnosed clinically and microscopically as *Leishmania cutis* and labelled by me as cases of Jericho boils only because they had passed through Jericho on a motor trip taken two years before the appearance of the lesions. It seems doubtful in the light of our recent findings whether these cases were really acquired in Jericho.

On the other hand there were cases seen before 1924 which clinically seemed typical cases of oriental sore though they had never visited Jericho, and Leishman-Donovan bodies were not found. Only a single examination was made at that time because the author was under the impression that all cases of cutaneous Leishmaniasis in Palestine were acquired in Jericho.

The facts stated above prove that cutaneous Leishmaniasis is present in Palestine throughout a large area of the country and it is interesting to note that this area shows very large variations in geographical and meteorological conditions. Jericho (820 feet below sea level), with a tropical climate, Jerusalem (2,593 feet above sea level), with a temperate climate, Kantara (150 feet above sea level), localities which differ from each other meteorologically, are all foci of the disease (see map). The following is a brief clinical description of the disease as observed in Jerusalem.

The number of sores in a single individual varied from one to one hundred and fifty eight. The lesions consisted of elevations of the skin varying in size from a small papule to sores $1\frac{3}{4}$ cm. in diameter (Plate XXXI, fig. 2). The lesions observed in the outpatient department were of various stages of development and duration. The more recent cases (when free from secondary infection) showed reddish or bluish-red non-ulcerating, flat, indurated and indolent tubercles, the more advanced cases showed indurated ulcers (the induration included the subcutaneous tissue) covered with serous, sero-haemorrhagic (where secondary infection was present, with sero-purulent) crusts and surrounded by a brownish or bluish-red halo.

Cases of *Leishmania verrucosa* and *Leishmania framboesiformis* were noted to occur.

Only three cases showed infection of a mucous surface, all of them in the mucosa of the lower lip. Lesions free from secondary infection did not give rise to symptoms.

Cases from Jericho, Artuf, Baghdad, Aleppo, Egypt and Persia all showed a similar clinical picture well known from the literature on the subject. Differences in the clinical manifestations of various cases depend either on variations in the virulence of *Leishmania-tropica* or chiefly on the peculiarities of the skin of infected individuals, and are in no way related to the locality where the infection was acquired. This view is also supported by the recent work of Kligler (1926), who showed that the parasites from oriental sores acquired in various localities (Palestine and Baghdad) were biologically identical.

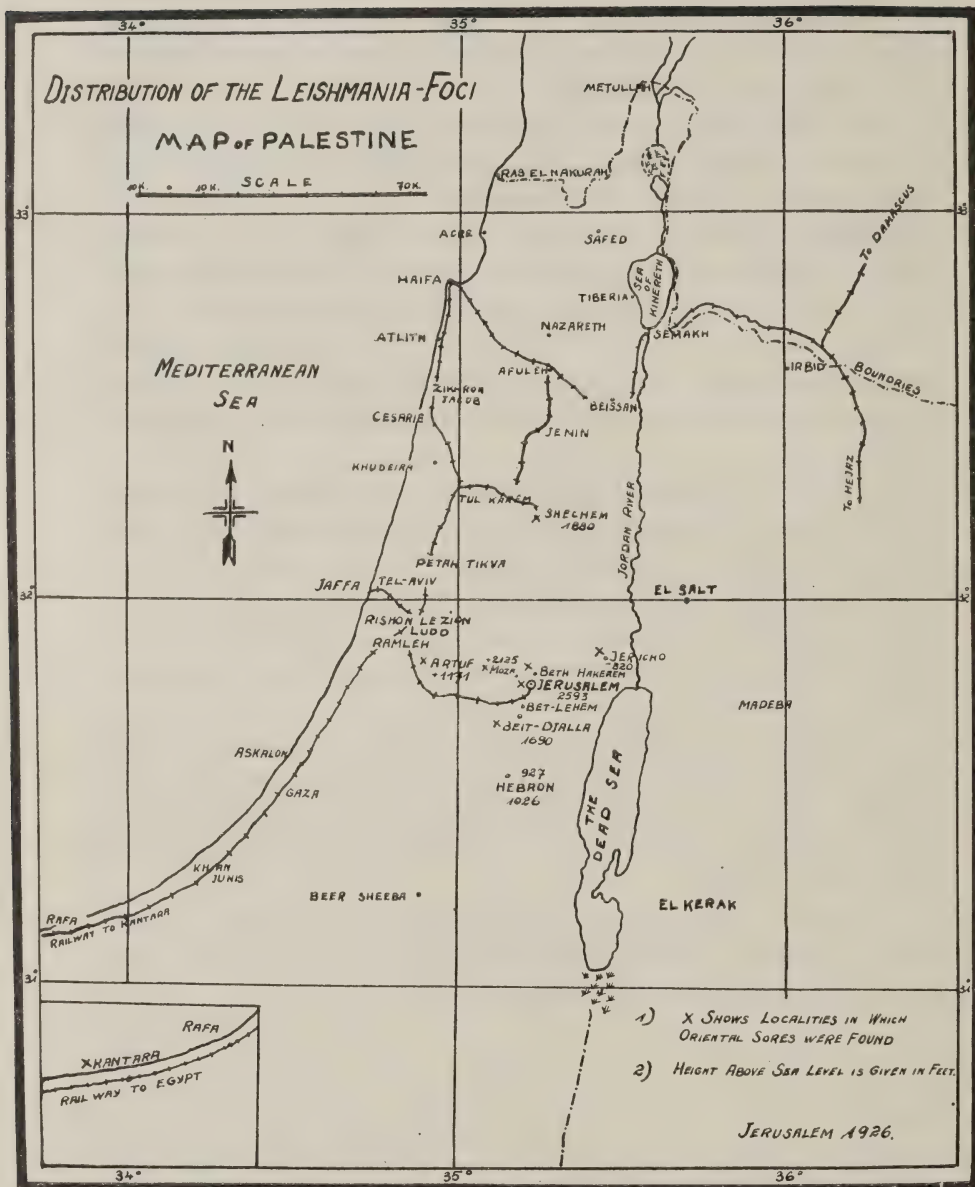
Dr. Adler informed me that in one case experimentally induced by injection of *Herpetomonas* from *Phlebotomus papatasi* a subcutaneous nodule was produced (the lesion was examined by the author) and that further inoculation from this lesion into another human case produced a papule. It appears therefore that variations in individual human beings are a more important factor than variations in *Leishmania tropica*.

In several cases with numerous lesions in the upper limbs the supratrochlear and the axillary glands were enlarged and hard, but painless. In one case (No. 1124) (Wassermann reaction negative) where the supratrochlear gland was excised, no Leishman-Donovan bodies were found.

In Case 27 a Wassermann reaction was made by Dr. Yunowitz, in the laboratory of the Rothschild Hospital (Dr. A. Felix). The results are shown in the following table:—

TABLE I.

Results	...	...	...	...	...	+++	++	+	±	?	—
No. of case	...	...	...	...	...	2	3	4	9	1	8



None of the above cases showed symptoms nor did they give a clinical history of lues. Case No. 522, which showed a strong W.R., was refractory (in respect to the Leishmaniasis) to neo-salvarsan, but responded readily to tartar emetic. The degree of the Wassermann reaction showed no relationship to the number of oriental sores. Thus Case No. 522, W.R. + + +, showed 158 boils, while Case No. 1769, W. R. + + +, showed only one lesion. Case No. 1127 (Plate XXXII) which had an enlarged supratrochlear gland showed unexpectedly a negative Wassermann before and after treatment.

The results of the Wassermann reaction, although made on a small number of cases, show that in cutaneous Leishmaniasis a large percentage of cases show changes which give rise to a positive reaction in the serum. The relationship of oriental sores to the Wassermann reaction requires further investigations, for should a definite positive relationship be established the interpretation of the W.R. in endemic centres of oriental sore will be complicated.

We were unfortunately not able to determine the ultimate result of treatment (for oriental sore) on the W.R. for the cases did not return to the clinic after completion of treatment.

Dr. S. Adler, of the Microbiological Institute, Jerusalem, informs me that he has found Napier's formaldehyde reaction negative in sixteen cases of oriental sore, thirteen natural infections and three artificial infections. This result, which is in marked contrast to the findings in Kala-Azar, adds to the already ample evidence of the biological difference of *Leishmania tropica* and *Leishmania donovani*.

The appearance of new foci of oriental sore is of epidemiological rather than of clinical interest. Of particular interest is the localisation of the lesion which in many exanthemata provides useful aetiological information. Many authors have rightly attached great importance to the distribution of the lesions in cutaneous Leishmaniasis. The accompanying fig. 1 and Table II show the distribution of the lesion in the cases under the author's notice.

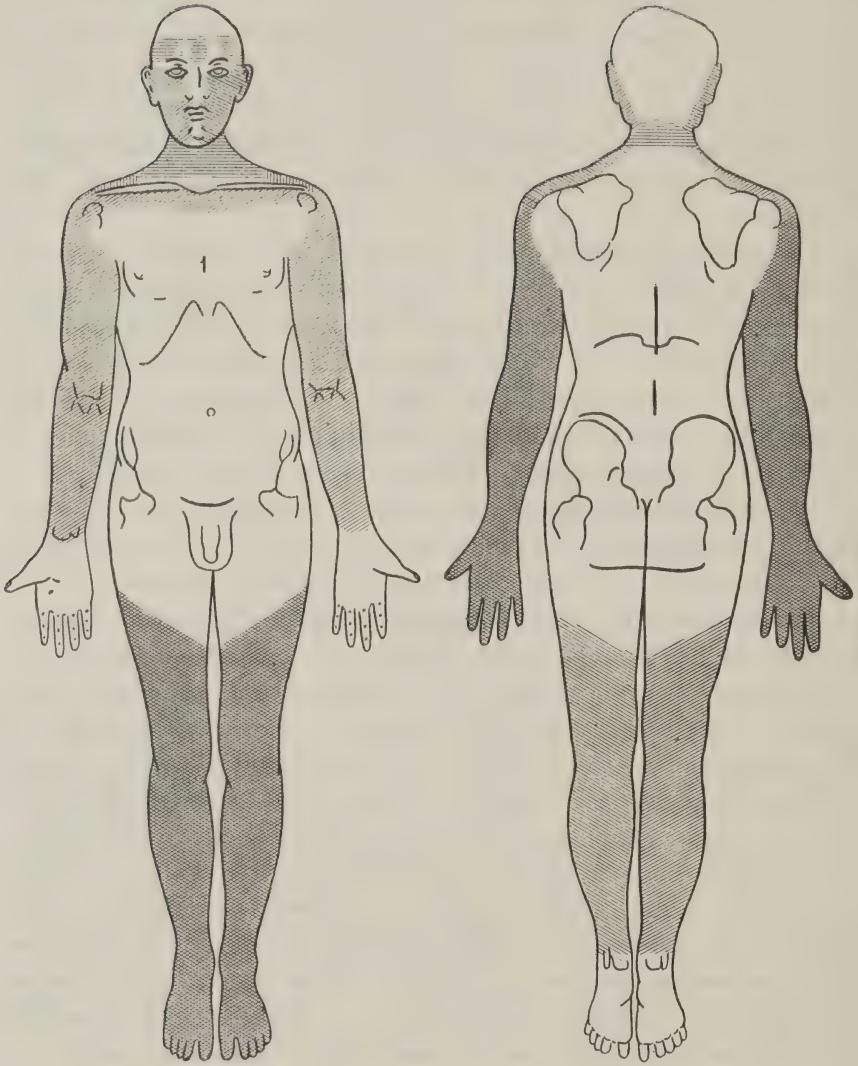


FIG. 1. Anatomical Localisation of Sores graphically represented; showing the dorsal localisation on the extremities.

TABLE II.

Distribution of Leishmania Sores in different parts of the body in 100 cases.

	Palestine		Persia		Mesopotamia		Syria		Samarkand		Trans-jordania		Egypt		Afghanistan		Total in all of the countries		Total in both sexes	Total %
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
No. of cases...	14	14	18	13	20	16	1	...	1	...	1	...	1	...	1	...	57	43	100	
Localisation :																				
Scalp	24	12	19	15	26	44	1	...	1	...	1	...	1	...	1	...	74	71	145	23.3
Neck ...	4	...	1	1	2	4	...	...	1	...	...	...	...	...	...	...	8	5	13	2.1
Trunk ...	...	...	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	4	4	0.6
Arm ...	...	14	...	...	1	21	...	...	...	...	...	...	...	...	...	...	1	35	36	5.8
Forearm ...	46	28	23	20	35	70	...	...	...	...	...	...	...	...	...	...	104	118	222	35.6
Hand ...	8	6	5	...	11	27	...	...	...	...	...	...	...	...	...	...	24	33	57	9.1
Thigh ...	...	2	1	...	2	17	...	...	...	...	...	...	...	...	...	...	3	19	22	3.5
Leg ...	...	14	8	2	4	51	1	...	...	...	...	...	...	...	...	...	13	67	80	12.8
Foot ...	1	2	4	6	6	24	1	...	...	...	...	...	...	...	...	...	12	32	44	7.1
Total No. of sores ...	83	78	61	46	87	260	3	...	2	...	1	...	1	...	1	...	239	384	623	100.0

TABLE III.

Distribution of sores on extremities in 36 cases.

Localisation						Palestine, 16 cases		Exogenous, 20 cases		Total	
						Dorsal	Volar	Dorsal	Volar	Dorsal	Volar
Arm	...	...	...	...	...	2	...	8	2	10	2
Forearm	...	...	...	...	...	10	...	58	14	68	14
Hand	...	...	...	...	...	4	...	15	...	19	...
Thigh	...	...	...	...	...	2	...	10	...	12	...
Leg ...	...	...	...	...	...	2	...	34	3	36	3
Foot	...	...	...	...	...	1	...	22	...	23	...
Total	...	...	...	...	...	21	...	147	19	168	19

The table proves that *the lesions are most common on the extremities and face and are very rare on the body* (Plate XXXII). Only 0.6 per cent. were found on the upper and anterior part of the thorax. The distribution of the lesions is as follows : forearm (35.6 per cent.), face (23.3 per cent.), leg (12.8 per cent.), hand (9.1 per cent.), foot (7.1 per cent.), upper arm (5.8 per cent.), thigh (3.5 per cent.), neck (2.1 per cent.).

On the extremities the lesions were noted to be most prevalent on the dorsal aspects. Out of 36 cases in which the distribution on the extremities was particularly studied, 168 out of a total of 187 lesions on the extremities (i.e., 89 per cent.) were dorsal. *Volae manus and plantae pedis were never affected.* (Table No. III.)

Several authors have considered the presence of single or multiple lesions as characteristic of various endemic foci. Our material collected in sufficient numbers from various foci disproves this view, e.g., out of 37 cases from Persia 13 had single lesions, out of 35 cases from Mesopotamia 11 had single lesions, out of 9 cases from Jericho 3 had single lesions, out of 17 cases from Palestine (apart from Jericho) 5 had single lesions. *There are no foci characterised by single or multiple lesions.*

The actual date of the appearance of the lesion is in many cases difficult to determine, for the appearance of small papules often escapes the attention of intelligent patients in good circumstances and is entirely overlooked by labourers who report only when, owing to its large size or to secondary infection, the lesion interferes with their work (the bulk of our patients were labourers). The date of reporting to the outpatient department is of no aetiological importance, being entirely dependent on subjective factors. We cannot therefore make use of the seasonal factor in determining the aetiology of the disease.

In 74 cases, however, we attempted on the basis of information, which at best leaves room for error, to determine the date of the appearance of the lesion. As will be seen from Table IV, there is no great difference in the appearance of the lesion according to the months of the year.

The conclusion may be drawn (with no great certainty) that 65 per cent. of the lesions appear between September and April, i.e., immediately before and during the rainy season. In the cases

acquired in Palestine where the information could be controlled the date of noting the lesions by the patient also gave no certain seasonal information of aetiological value.

TABLE IV.
Monthly distribution of occurrence of Leishmania Sores.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1921 ...	1	...	...	...	...	...	2 (1)*	...	...	...	...	...	3 (1)
1922 ...	...	...	...	...	...	...	1	...	...	1	1	...	3
1923 ...	3	...	1	2 (1)	3 (1)	3	...	1	2 (1)	(1)	1	1	18 (4)
1924 ...	6 (5)	2 (2)	...	1 (1)	2 (1)	1	4	2	2	3 (3)	...	1	24 (12)
1925 ...	...	1	2 (1)	...	1	...	...	3	4 (2)	4	5	1	21 (3)
1926 ...	4 (2)	1 (1)	...	...	...	...	...	...	...	...	...	...	5 (3)
Total ...	14 (7)	4 (3)	3 (1)	3 (2)	6 (2)	4	7 (1)	6	8 (3)	9 (4)	7	3	74 (23)

* The figures in brackets represent the Palestinian cases.

TABLE V. Age incidence.

Age	Jericho	New Palestine foci	Persia	Mesopotamia	Afghanistan	Samarkand	Trans-jordania	Egypt	Syria	Total
0-5 ...	...	2	5	...	1	...	...	...	...	8
5-10 ...	...	4	6	4	...	1	...	...	1	16
10-15 ...	...	4	7	12	...	...	...	...	...	23
15-20 ...	3	3	...	6	...	...	...	1	...	13
20-30 ...	5	2	5	7	...	...	1	...	...	20
30-40 ...	...	1	3	4	...	...	...	...	...	8
40-50 ...	...	2	3	3	...	...	...	...	...	8
50-60 ...	1	1	1	...	...	...	...	...	...	3
60-70 ...	...	...	1	...	...	...	...	...	...	1
Total ...	9	19	31	36	1	1	1	1	1	100

Table V shows that in endogenous and exogenous cases all ages are affected with cutaneous Leishmaniasis, but the table does not give the real age distribution of the disease for most of the cases are immigrants and immigration is selective. The probability is that the infection rate among children is greater than the table shows. The numbers from Jericho are small for the population of Jericho does not as a rule come to the Jerusalem clinics. The nine cases from Jericho were not local but acquired the disease during a short stay in that town.

An interesting phenomenon noted was the appearance of the disease in families, i.e., 24 of the cases were in 7 families. In our opinion these figures are probably an underestimate for it was not found possible to examine all the members of patients' families. The cases were naturally selective, for while a girl with an oriental sore on her face hastens to the out-patient department, a labourer with a sore on his forearm, knowing the disease not to be serious, does not report at all. The endemic focus in Artuf (10 cases) was discovered only because a lady had an oriental sore on her face.

There are two possible explanations of the spread of cutaneous Leishmaniasis in Palestine.

1. Cases from Jericho or from other well-known foci of the disease in the Near East infect new cases while passing through the country.
2. The same favourable conditions for the spread of the disease which are present in Jericho also prevail to a lesser extent in other places where the disease occasionally appears.

The first explanation presumes that cutaneous Leishmaniasis spreads by direct contact but in the four cases recorded above the author could trace no history of contact with cases of the disease nor did any of them pass through previously recognised endemic foci of the disease.

The cases imported into Palestine are mostly poor Jewish immigrants from Persia (where the disease is endemic) who pass through Baghdad and Aleppo (also endemic foci) on their way to Palestine. These immigrants on arrival in Jerusalem usually confine themselves to three quarters of the city (Bukharia, Nachlat Zion, Shimon Hazadik) but they come in contact with the rest of the population during their work.

The author found a servant girl from Persia infected with

Leishmaniasis employed in Beth-Hakerem, a new suburb of Jerusalem, where, as previously stated, new cases of the disease were found. From this it may be thought that the new cases of Leishmaniasis in Jerusalem were acquired through direct or indirect contact.

In Cases II and IV (Arab children from Beth-Djalla), 8 kilometres from Jerusalem, and in Case IX in Artuf (22 kilometres from Jerusalem) contact with infected immigrants can be excluded with certainty and in the other cases contact was extremely unlikely.

Johnstone (1925) thought that the presence during 1917-1918 of a number of cases of cutaneous Leishmaniasis in a military hospital in the neighbourhood of Artuf was responsible for the outbreak of the disease in the latter village. This view is not justified, for it was not till 1923 that the first cases occurred in Artuf, i.e., an incubation period longer than any hitherto recorded. Since 1921, a physician was present in Artuf and it is unlikely that in a small population of one hundred and fourteen, chronic ulcers would have passed unnoticed.

Against the contact theory there is the evidence of the well-known fact, that cutaneous Leishmaniasis cannot be inoculated experimentally through unbroken skin.

It is interesting that new cases have not so far been seen in the districts where the immigrants from Persia settled, in spite of the fact that these districts are very poor and overcrowded. It is also interesting to note that the patients and their relatives often state that the sores are not infectious. It appears, therefore, that the presence of a large number of cases in one district is of itself insufficient to cause an epidemic in that district.

An infection through direct contact, even in families, although theoretically possible, can only be in the nature of a rare accident. The occurrence of the disease in families points to a common aetiological factor.

The aetiology of Case IX is of particular interest. Inquiries proved that this case (a schoolmistress) inhabited a room in the same house in Beth Hakerem as Cases V, VI, VII and VIII for three months. Case V first noted the sore on her nose about a month after leaving Beth Hakerem and Case IX, who had also left Beth Hakerem, noted a sore on her forearm at approximately the same

time. No persons from Jericho or other endemic centres inhabited the same house and it is difficult to find the common first cause of these cases.

The above facts speak against the theory of infection by direct contact.

THE THEORY OF TRANSMISSION BY BITING INSECTS

The facts in favour of this theory have been sufficiently discussed in the literature on the subject. I would briefly emphasize several facts observed in my own clinic which support this view.

1. The localisation of sores on points which are exposed to the bites of insects by night.

2. In cases of oriental sore suffering also from *Pediculus corporis*, and in which there was an obvious opportunity for the spread of the disease by scratching, the sores still showed the characteristic localisation. (This proves that lice are not carriers.)

3. In case of oriental sores on the extremities the dorsal surface was usually attacked.

4. The distal parts of the extremities were usually attacked, the proximal parts (upper arm and thigh) rarely.

Transmission by insects is proved by the experiments of the Sergeants, Ed. and Et., Parrot, L., Begnet, U., and Donatien (1921), de Baurepaix, Aragao (1922), and those of Adler and Theodor (1925). The former observers transmitted cutaneous Leishmaniasis to man by inoculation from an emulsion of sandflies which they considered to be *Phlebotomus papatasi* (the emulsion, however, on examination, was not found to contain *Herpetomonas*) and the latter observers inoculated *Herpetomonas* from sandflies into man and produced in one case a typical oriental sore, and in two cases cutaneous Leishmaniasis which did not appear clinically typical to the author. This experiment should be controlled in other endemic centres in order to corroborate the *Phlebotomus* theory. So far *Phlebotomus papatasi* only has been used for the experimental transmission of oriental sore and it still remains to be determined whether other species of the genus *Phlebotomus* and, indeed, biting insects of other genera are capable of transmitting the disease.

The transmission experiments so far performed are subject to the criticism that the lesions are a Herpetomoniasis of the skin caused by an artificially introduced Herpetomonas which is not biologically identical with *Leishmania tropica*. The relationship between species of Herpetomonas in general and *Leishmania tropica* remains to be determined by biological reactions such as agglutination (Kligler, 1925, 1926, Noguchi, 1925) if possible by complement deviation. (Dr. Adler informs me that the three experimental strains were found to be biologically identical with *Leishmania tropica*.)

Again it still remains to be determined whether *Leishmania tropica* undergoes a biological cycle in sandflies. The work of Adler and Theodor tends to show that there is such a cycle in *Phlebotomus papatasi* but their evidence is not complete and so far applies to one species of sandfly.

The appearance of new cases in hitherto non-endemic centres of the disease can be explained on the *Phlebotomus* theory. In a constant endemic centre of oriental sore the percentage of infected sandflies is relatively high and the probability of human infections is correspondingly high. Thus Wenyon (1912) found 6 per cent. of sandflies infected in Aleppo. In Jericho, a smaller endemic centre, Adler and Theodor found an infection rate with Herpetomonas of one per thousand during 1925 (according to a personal communication of Dr. Adler). In localities where the percentage of infected sandflies is small, cases of oriental sore will be few or incidental as our observations in Palestine show. It is probable that the number of lesions per person is also ultimately dependent on the percentage of infected sandflies: thus in places where cases are few such as Kantara, Mozza, Jerusalem, single sores only were found, while in heavily infected centres multiple lesions are common.

There is yet another factor in the epidemiology of oriental sore which must be borne in mind. The infestation of various places in Palestine with sandflies is not constant. There are great variations due to undetermined causes. In Artuf, for instance, they were numerous. The inhabitants of Mozza stated that 'the small greyish insects which bite and do not make a noise' are not noticed some years and in other years they are a pest. This statement, although made by villagers, cannot be disregarded.

The possibility of sandflies being carried from place to place by transport (railway wagons, etc.) must be considered, although there is no evidence as yet on this subject.

Finally the arrival of cases from an endemic focus to a new locality may give rise to an infection in the local sandflies and thus new cases may be infected.

We have attempted to explain the paucity of locally acquired cases of oriental sore in Palestine on epidemiological grounds, i.e., on a small infection rate with *Herpetomonas* among sandflies.

SUMMARY AND CONCLUSIONS

1. Oriental sore is present in various localities of Palestine.
2. There are locally acquired cases in various parts of Palestine.
3. The clinical history of the cases noted and the distribution of the cases and the lesions can be explained on the hypothesis that sandflies carry the disease.

EXPLANATION OF PLATE XXX

Fig. 1. *Leishmania ulcerosa*. From Jerusalem.

Fig. 2. *Leishmania verrucosa gigantea*. From Baghdad.
Size of lesion $13\frac{1}{2}$ cm. Ulcerated area $8\frac{1}{2}$ cm.



FIG. 2

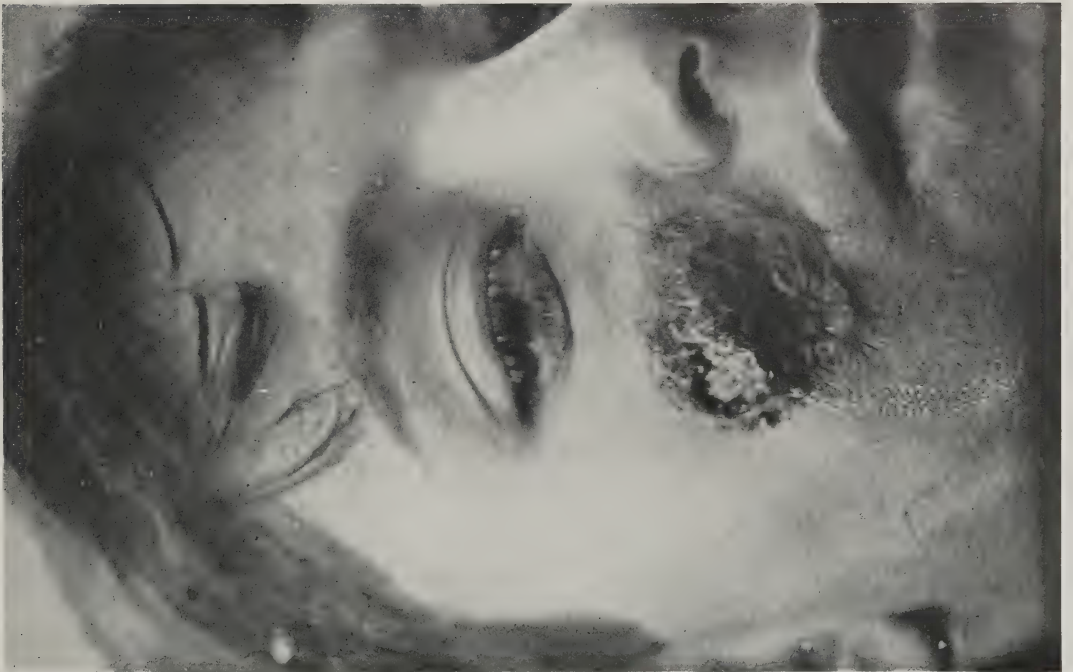


FIG. 1

EXPLANATION OF PLATE XXXI

Fig. 1. *Leishmania ulcerosa*. From Beth-Djalla (Palestine).

Fig. 2. *Leishmania nodosa*, From Beth-Djalla (Palestine).



FIG. 2



FIG. 1

EXPLANATION OF PLATE XXXII

Leishmania ulcerosa on the trunk. From Persia (or Baghdad). .

